

EXHIBIT 15



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**Summary of
Fuel Injection Equipment With
Respect to Diesel Fuel Filtration**

From AVL and Racor Division of Parker Hannifin

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Executive Summary

In a climate of continued environmental focus there has been a drive towards reduced tailpipe emissions in all major global markets. In order for manufacturers to develop engines that can comply with the new legislations, engine technologies have been developed both in complexity and cost.

Additionally, there has been a demand to reduce fuel consumption and greenhouse gas production. To deal with these demands, diesel engine injection pressures have increased to the 2500 bar (36,300 psi) range, driven by the criteria emissions benefits associated with higher injection pressures. Complex after-treatment systems coupled with a drive for improved NVH has led to an increase in injection flexibility with multiple pilot injections and late post injections for DPF and SCR management. Common rail has emerged as the mainstream technology across all sectors.

The increase in system pressures in diesel engines has a significant effect on filtration requirements. These systems are highly vulnerable to many forms of contaminants and the need for robust high efficiency filtration has never been higher. The costs of fuel injection systems have also risen in line with system pressure increases and this further justifies the increase in filtration efficiency to protect these systems.

An analysis of global diesel fuel quality shows that although the fuel quality in the developed markets has improved, significant quality concerns still remain.

Levels of water and contaminants remain at levels that can cause long term issues to the latest fuel injection systems. Specifically, the levels of contaminants smaller than 5 microns remain very high. These particles can be small enough to pass into the internal clearances of high pressure fuel injection systems and can lead to erosion and wear of critical areas leading to a loss in system performance and eventually system malfunction.

Diesel filtration balances pressure drop, useful life and efficiency. However the real long term effect on fuel system life is often not adequately considered; as much of the engine durability testing performed is done using high quality fuel that doesn't represent the range of fuels seen in the market. Consideration of filtration performance under less than ideal conditions is necessary to develop an acceptable level of protection.

Diesel fuel filters have become integral, complex engine systems, integrating multiple sensors, valves and pumps. As engines become more complex, manufacturers are looking for suppliers to take on more system development responsibility and offer integrated solutions. Filter modules are now available that integrate filtration and distribution functions for not only fuel, but for engine oil, coolant, and Selective Catalytic Reduction (SCR).

As overall engine costs have risen with increased emissions compliance, the cost pressures on existing engine components has also grown. By themselves, filters can still be seen as commodity products. However, filtration costs may be justified with use of new media technologies, sensors, function consolidation, and enhanced protection of fuel system components.

3.3. Engine Technology Drivers Summary

As previously stated emissions and fuel economy pressures have been the main drivers for engine technology development. Across all engine sectors this has led to the introduction of more advanced fuel injection systems, these systems have higher pressures, smaller nozzle holes, higher accuracy and advanced controls. In the developed regions this technology development has been matched with a focus on improved fuel quality.

In the on and off road diesel engine fields advanced after-treatment systems have been introduced and in many cases this has allowed the use of lower pressure fuel injection systems as the burden of emissions control is taken up by the SCR system.

A real challenge still exists for the emerging markets where the proposed emissions standards will drive the introduction of advanced engine and after-treatment systems, however the fuel quality in these regions has lagged behind leading to potential concerns with high pressure fuel systems, EGR systems and after-treatment. Improved fuel filtration is a key to ensuring robustness of the fuel systems in these markets.

Going forward, because of the difficulties of maintaining a clean supply of diesel at all times, more consideration should be applied to upstream sources of contamination as well as at the engine. Filtering recirculation systems can be applied to storage and onboard systems, along with high efficiency filters at the dispensing pump. Careful monitoring of fuel quality and filter performance is needed to protect sensitive diesel engine injection systems.



Figure 3-3 – Example of fuel dispensing cabinet with high efficiency filter

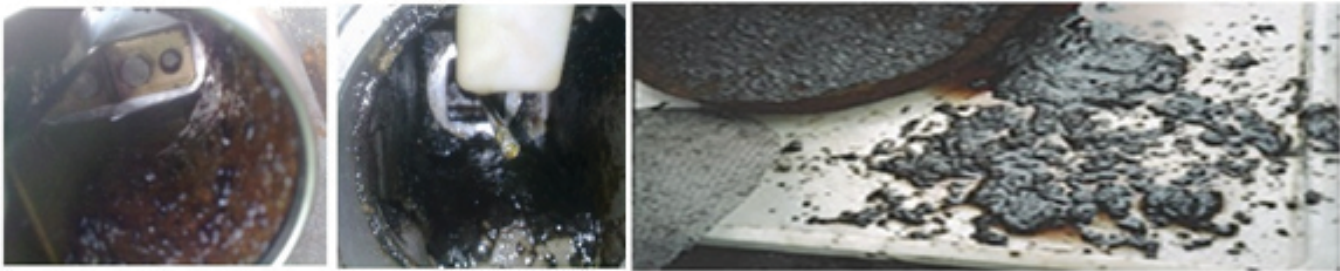


Figure 7-2 – Sludge Build up due to algae / particles formed by Acid attack

Diesel Decomposition

All #2 diesel fuels contain dissolved asphaltene-like hydrocarbons that tend to be caught by fuel filters. These long chain hydrocarbons do not harm engines directly but with heat and time they may cause deposits on fuel system components. Projected filter life must consider that filter plugging will be from these dissolved hydrocarbons and not necessarily from hard particle capture.

With heat and time diesel fuel can decompose and produce asphaltene-like hydrocarbons, which appear as black sludge on the surface of filters and at the bottom of fuel tanks. Old diesel fuel that sits too long in a vehicle tank or fueling storage tanks is subject to decomposition and the resulting sludge.

These asphaltene-like deposits will quickly clog a fuel filter, causing loss of engine power or complete shutdown. Replacing filters restores fuel flow but until all of the fuel is circulated thorough a filter, the plugging will continue.

Internal Deposits

Modern high pressure diesel fuel injection systems contain very small internal clearances and are vulnerable to any build-up of deposits on these components. Minute levels of chemicals in the fuel can react with the fuel in the high temperature environment inside the fuel system and lead to the formation of lacquer or deposits. This issue has become a significant concern in the industry, currently fuel additives / cleaners are used to remove these deposits, however fuel filtration that can remove these chemicals would be a significant step forward.